DRIVER

MAY 1981

trailering

towing safety

the backward mechanic's safari into darkest usedtrailerland

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TOWiNG

Here are a few of the basics on pulling a trailer, just to get you started.

Practice handling your trailer until you feel comfortable with it. A parking lot with lines for parking spaces is an excellent place to practice backing.

Traveling with a trailer, whether it's a small camping trailer or a 25-foot model with beds and bathroom, may be your key to getting away from complications and tensions of the city. It provides a lot of freedom, and it's a lot of fun.

However, as with many fun things trailering is complicated, and as with everything connected with automotive travel it has some very specific safety considerations. We're going to look at some of those, to help you avoid some problems as you take your trailer on a vacation, and to help you have as much fun as possible.

For the purpose of this article, we're assuming you have already picked out a trailer. You probably know what your needs are, and if you don't there are lots of dealers around who can help you. We're concerned with the safety side of trailering. But just a couple of items. Read the owner's manual for your trailer thoroughly, and read it again before you go anywhere. Keep it handy. It will have the tips on periodic maintenance, and it will give you emergency procedures such as how to change a tire.

Cars and hitches: One of your concerns should be whether your car is capable of pulling a trailer. Not every car has sufficient size and power to do so. Some of the smaller economy cars are not capable of pulling anything, and most cars will have an upper limit on the load they can safely tow. Check with the car's manufacturer to see how heavy a load it can pull. If this is sufficient for your trailer, then you're ready to have the hitch installed.

If it doesn't measure up, however, you may be able to have its towing ability upgraded by having a few extra things installed. These are heavy duty adjustable shocks and helper springs, an oil cooler, a transmission cooler, and larger tires.

If you can't alter your present car to tow, you can order a "trailer towing package" on a new car. This will include such items as anti-sway bars, oversize brakes, a high-capacity radiator, heavy-duty suspension, an oil cooler, a transmission cooler, a heavy-duty battery, a special (lower) rear-axle ratio, and possibly air-filled adjustable shock absorbers. Some other things you will want to think about are a limited-slip differential, and oversize tires. Most drivers find an automatic transmission and power steering make towing much easier. And, of course, you should order the largest engine you can get, for the least strain on your car.

Whatever you do, be sure to have the hitch installed on the car by experts, and make sure they know exactly what is to be pulled.

There are several different kinds of hitches, for specific jobs. There is a simple bumper hitch, one that clamps or bolts onto the bumper. It is ordinarily not safe for towing a trailer of any size. With today's hydraulic bumpers, of course, these hitches should be avoided.

Then there is the frame hitch. This bolts or welds onto the car's frame to distribute the load.

The third type of hitch is the torsion bar or load-equalizing hitch. This hitch creates upward pressure to counteract the downward pressure of the trailer's tongue or hitch weight. It automatically levels the car and improves the car's handling at all speeds. (See the chart on page 4 for the classes of trailer hitches.)

There are also classes for the size of the hitch ball, which relate to the load the ball will carry. Make sure the hitch ball is the proper size.

At the same time as the hitch is installed, you should have the wiring put in for the taillights and brakes of the trailer. A single plug by the hitch should connect the car and trailer electrical systems together.

The only other things your car needs are the large clamp-on or bolt-on mirrors. These are necessary to allow you to see around the trailer.

Brakes and tires: Trailers above 1000 or 1500 pounds are required by law to be equipped with trailer brakes. With separate trailer brakes, the stopping distance for your rig should be about the same as for the car alone, but don't let that make you overconfident. You're still hauling a heavy load, and the braking can be tricky.

Brakes are a big subject, so we'll just make a couple of general statements. Your car should have controls such that you can apply both car and trailer brakes by pressing the car's brake pedal. And you should have a separate lever to control just the trailer brakes, to handle emergencies like swaying.

The tires on your trailer are just as important for safety on the road as the tires on your car. Always keep all tires on the trailer the same size and type, that is, no bias tires mixed with radials. And carry a spare tire with you in case of a blowout. You cannot be sure of finding the proper tire while you're traveling. Never overload the tires. Check the manufacturer's specifications.

Inflation pressure is just as important with trailer tires as with car tires. If your tires are under-inflated, the trailer can carry less weight, and the tires may overheat and blow out. Overinflation can also affect the handling of the trailer and, again, can cause blowouts.

To check the inflation pressure, have your own tire gauge. Don't rely on the pressure gauge at the service

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DRIVER

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MAY

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THE EDITOR SPEAKS

DOUBLE CLUTCH

GOVERNMENT AND YOUR CAR

One of the things we have warned you about in this column is the absolute necessity of insuring that a car you buy outside the country can meet U.S. standards if you plan to bring it home with you. Many servicemembers have learned the hard way that shipping in a foreign car not made for the American market brings them face to face with stern U.S. Customs officials and some brutally expensive modifications to the vehicle — modifications that can be accomplished only after the posting of a cash bond equal to the value of the automobile.

It now seems the problem will be dealt with in another way. If a NHTSA proposal (being worked out with Customs and EPA) is finalized into a regulation amendment, as is expected by the end of summer, every individual will be allowed a one-time exemption from EPA regulations for the import of one exotic car per person.

On another government front, the Federal Trade Commission has just agreed to require that when used cars are sold they carry window stickers disclosing major defects and warranties. The sticker, which would warn consumers that "spoken promises are difficult to enforce," essentially would ask dealers to put their vocal endorsements in writing.

The FTC staff had originally proposed a rule calling for mandatory inspections by dealers of 14 major systems, such as brakes and transmissions, and the posting of window stickers saying the systems were OK or Not OK. This tough proposal came about after an investigation disclosed widespread misrepresentation among used car dealers. However, the FTC chairman said he did not believe any shorthand system of inspection disclosure could adequately convey the performance characteristics of cars varying widely in age and condition. So the commission chose a window sticker "buyer's guide" with spaces for dealers to explain just what warranties they would offer and what major defects were known. Even though the final FTC proposal is less stringent than first expected, the nation's used car dealers are expected to press for congressional review.

towing safety

continued

stations, because you will get variable readings. Your own gauge will be more consistent. Another thing: Check the pressure only when the tires are cold, for instance in the morning. Tires, especially trailer tires, will get very hot on the road, which will increase the pressure.

Do not let air out of the tires if you think they're getting too hot. That will make the pressure too low when the tires cool. It is better to slow down, especially on very hot days, and to stop every few hours to let them cool down. (For more general information on tires, see DRIVER's special tire issue, January 1981.)

Practice, practice, practice: To do anything right with a trailer, you have to practice. Everything handles a little (or in some cases, a lot) differently. Practice starting, stopping, backing and turning with your trailer until you feel comfortable with how it feels. Get used to using the big outside mirrors on the car. With most trailers, your inside rearview will be useless. Practice going up and down hills, and practice easy, smooth acceleration and braking. We'll discuss these in a little more detail later.

Balanced loading: With the trailer and tow vehicle properly outfitted, you must now make sure the trailer is properly balanced for travel. Only 10 to 15 percent of the trailer's total weight should be on the trailer tongue. (Check the manual!) To accurately gauge this, it is necessary to weigh the trailer. You can go to a commercial truck scale, usually found at truck stops, and weigh it there. First, drive the trailer onto the scale and disconnect it (as shown below in our illustrations). Weigh the entire trailer (it should be loaded with all the gear it will be carrying on a trip). Then move the trailer so that only the coupler (tongue) is resting on the scale and weigh that. If the tongue weight is in the proper range, you're ready. If not, you will have to

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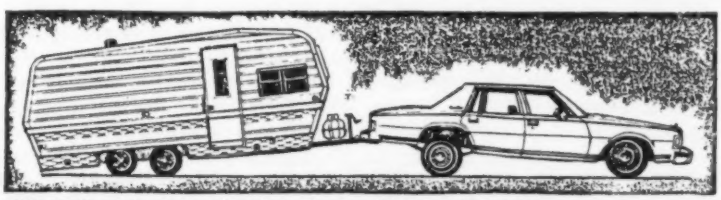
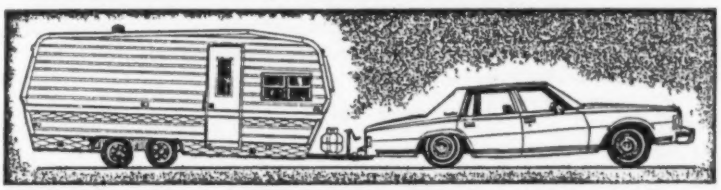
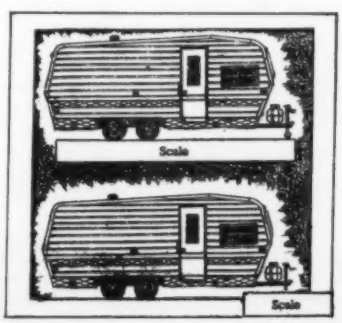


This trailer is loaded too heavily in the rear. It is prone to swaying.



This trailer is loaded too heavily in the front. It can cause you trouble with your braking. Also, the overloaded hitch could create a greater tendency toward hydroplaning on wet roads.



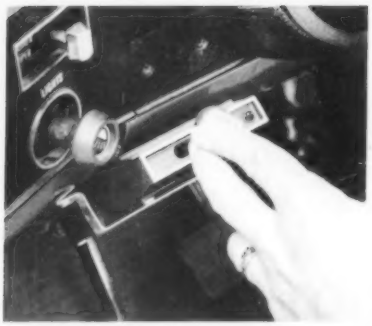
Weigh your trailer at a commercial truck scale to determine the gross trailer weight.

Then move it so that only the hitch is resting on the scale. If the hitch weight isn't within the proper range, shift the cargo forward or aft until it is.

continued

(left)
Backing a trailer requires a lot of practice. Put your hand on the *bottom* of the steering wheel. To move the trailer to the left, move your hand to the left, and to move the trailer to the right, move your hand to the right.

(below)
Begin to straighten the tow vehicle as soon as the trailer begins to turn. If you don't you might jackknife the rig and damage something.



This is a separate control for the trailer brakes. You need to be able to work the trailer brakes alone for sway control.

shift some of the cargo forward or back until the tongue weight is right. Remember where things are at that point and pack the trailer the same way each time.

Packing up: Use care in packing your trailer. As we said, balance the weight in the trailer for the proper hitch weight, and don't load the trailer higher than its capacity. This is in the owner's manual or printed on the trailer itself. If it isn't, check with the manufacturer. Too much weight in the front will cause an overloaded hitch and braking trouble. Too much weight in the rear can cause the trailer to sway — an extremely dangerous situation.

CLASSIFICATION OF TRAILER HITCHES

Trailer Class	Hitch Class	Gross Trailer Weight (Maximum) (GTW)	Static Tongue Load	Recommended Hitch Type
1	I	2,000 pounds or less	10-15% of Max GTW	Weight Carrying or Weight Distribution
2	II	2,001 thru 3,500 pounds	10-15% of Max GTW	Weight Carrying for lighter tongue loads; Weight Distribution for tongue loads greater than 300 lbs.
3	III	3,501 thru 5,000 pounds	15% of Max GTW	Weight Distribution
4	IV	Over 5,000 pounds	15% of Max GTW	Weight Distribution plus anti-sway device

(Department of Transportation)

Also, balance the load side-to-side. This will make the trailer ride more stable. Put heavy things down low and toward the front to keep the center of gravity low and to provide more stability in curves.

Another reason for keeping the heavy things close to the floor is to avoid the possibility of them falling out of overhead storage during severe cornering. Instead, put light things like blankets and clothes in the overhead storage. Put everything you can into the cabinets and secure the cabinet doors to keep things from shifting around and falling out as you travel.

Store all the fragile items close to the front of the trailer, if you can, because the trailer rides smoother toward the front. Wherever you put the fragile things, pack pillows or bedding around them to keep them from breaking. By the way, get some non-breakable dishes for traveling.

Put any loose items like the burners on the stove away for travel. Use the nooks and crannies of the trailer

When you are traveling, turn off the gas *at the tank.*

These special add-on mirrors will help you see around the trailer.

— put things in the sink and in the oven, and pack things like newspaper around them to keep them from rattling.

It's a good idea to keep things you need frequently, or emergency supplies, in easy-to-reach places. Digging through packed supplies is not fun when you're in a hurry. If you have outside storage compartments, you might keep tools, water, first aid kit, flashlight and similar items there.

On the subject of tools, we've included a separate list of what you should bring along.

Trailer handling: No doubt about it, pulling a trailer is a strain on the car. We've read that with a heavy trailer your mileage will go down 40 to 50 percent, a fast acceleration will use 35 percent more gas, your climbing ability will fall off 50 to 75 percent, your top speed will be reduced by as much as 50 percent, and your acceleration time will be doubled.

Remembering the last item on that list, don't try to accelerate quickly. Fast starts put a bad strain on the car and its engine. With a manual transmission, shift smoothly and don't try for maximum acceleration in each gear.

Try to maintain your momentum and don't make unnecessary stops. Time your arrival at stoplights to avoid stopping if possible. Stop-and-start traveling with a trailer puts the most stress on the car, so stay out of city traffic if you can, especially at rush hour.

Freeways and interstate highways are good roads to travel with a trailer. Traffic moves more smoothly because there are no intersections, and the steepness of grades is limited.

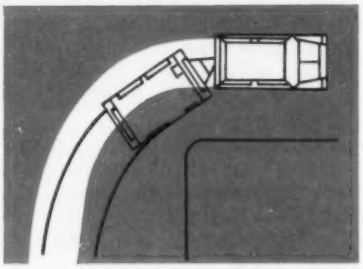
Steepness is an important factor. When climbing hills, especially steep ones, you must put your car in a low gear. This will put less stress on the engine. When you're approaching a hill, speed up to build your momentum so that you can get over it more easily. On the downhill side, again put the car in a low gear to allow the engine to aid in braking. Over-use of your brakes (car *and* trailer) on long hills could cause them to overheat and fail. Take it easy on hills.

Keep your speed down on bumpy roads. Besides being bad for suspensions, ruts and holes could cause the trailer to bottom out and be damaged.

When you make turns, remember the trailer doesn't travel in the same curve as the car (see the illustration). Make a wider turn with the car to accomodate the trailer's shallower curve, and to avoid running over a curb.

Winds will seriously affect your trailer's handling, so slow down. Don't travel in high winds.

Swaying: Swaying, or "fishtailing," is something we don't wish on you, but still something you should be prepared for. It could be caused by gusting winds, an uneven road surface, or too quick a driving



Make any turn wider with your car, because the trailer makes a tighter turn and might run over a curb.

maneuver. Whatever its cause, you need to get it stopped as soon as possible, to avoid jackknifing the rig or overturning.

When swaying occurs, keep off the car's brakes. The National Safety Council recommends speeding up just a little to get the trailer to straighten out, or applying *only* the trailer brakes while speeding up a little. Then stop, check out the cause of the swaying, and fix whatever is wrong. If you're going downhill, skip the acceleration and just use the trailer brakes.

Wetness: The best way to handle wet weather while traveling with a trailer is to sit in the trailer and wait for better weather. Avoid driving on ice and snow, or in heavy rain, while hauling a trailer. If you run into some bad weather while you're driving, be very careful.

If rain starts to fall, slow your car 10 to 15 mph, for instance from 55 to

continued

(left)
The connection for the trailer's brakes and lights should be a single plug, for ease and speed of hook-ups.

45 or 40 mph. A car and trailer can become quite unsteady on wet roads, and there is a danger of hydroplaning.

Hydroplaning is a phenomenon that causes the weight of your vehicle to be supported by a film of water on the road. In an automobile, hydroplaning is caused by too much speed, too much water on the road, too little tread on the tires, and too little air pressure in the tires.

An additional problem can cause hydroplaning when you're pulling a trailer — too much weight in the back. When your trailer is loaded so that too much weight is resting on the hitch, it causes your car to become light in the front and increases the chance of a wet skid. Always make sure your trailer is balanced when you are packing it.

The moment you realize — or even *suspect* – you are hydroplaning on a wet road, slow down. Then, try to follow the tracks left by a car ahead, for surer footing. But keep your speed down.

PLAN AHEAD

Plan ahead so you'll eliminate unpleasant surprises at the other end of your trail. Consult the law enforcement authorities on the local ordinances along your travel route. The highway patrol can tell you about the weather and road conditions you will encounter.

An auto club is another excellent source of this information and they provide emergency aid to members, so think about joining one. The auto club can also help you make advance reservations for the trailer campgrounds along your route, so you won't get shut out.

Along the way, you can check in the visitor's centers as you enter each state for any help they can give you.

Whatever you do, listen on your radio for high wind warnings, when trailers are prohibited from highways. And be aware of any special slower speed limits for trailers.

Store items you will need quickly, like emergency equipment, in an easy-to-reach place, like this outside storage compartment.

Ice and snow: We'll say it again — when it's icy or snowing, forget trailering. Get in the trailer, heat up some coffee and watch the tube, but don't drive. However, you might encounter ice *while* you're traveling, so here's how to handle it. When slowing, always apply your brakes gently. If you begin to slide, get off the brakes and apply them again, even more gently, until you slow the rig.

Following distance: When pulling a trailer, don't follow anyone too closely. We have often mentioned the "two-second rule" for automotive following distances. This is where you let the car ahead pass a stationary object and count "one-thousand-and-one, one-thousand-and-two" before you pass that same object. When hauling a trailer, you should change that to a "four-second rule."

Another way to look at following distance is to allow one length of the car *and* trailer for each ten miles per hour of speed. We thank it is easier to use the four-second rule, and the counting also gives you something to do on those long drives on your vacation.

Passing and being passed: With the additional weight of the trailer, and the resulting reduced speed and power at your command, you won't often be faced with the problem of passing another vehicle. But when the opportunity to pass comes, you'll want to keep in mind your decreased speed and power, and your increased weight and size.

A pass will take you longer to accomplish because your vehicle is heavier and slower, and it will require more room because your vehicle is longer. Never move out to pass until you're sure no oncoming traffic will overtake you, and never move back into your lane until you're sure your trailer will clear the car being passed.

A far more likely experience is being passed, by everything from midgimobiles to huge semis. The only time you need to be concerned is when you're being passed by some-

TOOLS FOR TRAILERING

Some of the experts have suggested the following tools for packing in the trailer. Always ask your local law enforcement authorities about the legally required items.

Several adjustable wrenches
Several screwdrivers (Standard and Phillips)
Pliers and adjustable pliers
Ratchet set
Extra spark plugs and sparkplug wrench
Wire
Funnel
Gas can (empty, of course)
4-way lug wrench
Spare nuts, bolts, washers, screws, etc.
Spare bulbs
Grease
Oil
Hydraulic Jacks
Wheel Chocks
Tire chains
Tow line
Tire gauge
Flashlight
Trouble light
Flares, or warning flashers or triangles
Fire extinguisher (required if you have a stove)
First aid kit
Shovel
Ax

The word for trailering in bad weather: Don't. When it's snowing, or raining, or when high winds are present, stop and relax. Trailers do not handle well in rotten weather.

thing large, like a semi. A large vehicle will create winds that could make your trailer unsteady. Move as far to the right as you can to allow space between the vehicles. Then, make sure your car is *pulling* the trailer, that you are not coasting. This will minimize the chance of swaying. If you are on a four-lane highway, you could speed up a little as the other vehicle passes, to avoid the swaying problem. (*Never* speed up while being passed on a two-lane highway, no matter what you're driving. Accelerating increases the difficulty for the passing vehicle, and could cause an accident.)

On two-lane highways, especially mountain roads, you shouldn't allow traffic to back up behind you if you can avoid it. People don't like to be trapped behind a slow-moving car and trailer. As soon as you see a turn-out, pull off the road and allow the other traffic to pass. It's more than courteous; it's the law in some states.

Backing: Backing a trailer is a process that takes a special knack, and one that is only gained through practice, as we mentioned. When you back a trailer, it doesn't go where you expect. If you steer so that the tail of the car goes to the left, the trailer attached to the back of the car will go to the right.

To help you remember which way it will go, try this: Put your hand on the *bottom* of the steering wheel. That way, when you move your hand to the left, the car's wheels will go to the right and the trailer will go to the left. (See the photographs on page 4 for a clearer understanding of this. Believe us, it works.)

Another very important thing to remember when backing is to begin to straighten the wheels of the car the moment the trailer begins to turn. If you continue to turn the car, you will jackknife the whole works, possibly damaging the trailer, or the rear bumper of the car, or the hitch, or any combination of the three.

Some people have had a special hitch installed on the front of their tow vehicle, just for the purpose of backing the trailer.

Before we leave backing, we want to tell you to avoid backing the trailer if you can, because backing is very tricky. For instance, when you're on the road, look for places to stop with large parking lots where you can drive *forward* to get out. We're not trying to scare you off, just to tell you not to back the trailer when it isn't necessary.

One more thing. An excellent place to practice backing is in an empty parking lot with plenty of lines for parking spaces. You can practice easing the trailer into a parking space until you know precisely how to control it.

Rest! We have some driving tips for those who go trailering and they are the same as we'd give to any vacationer: Don't drive when you're tired. Pulling a trailer requires more of you than ordinary driving, so you can't afford not to be alert. The passenger(s) should take over driving occasionally to allow the main driver to rest. Even during your stint of driving, stop once in a while. You can get out and stretch to revive yourself, and even have a snack. (This also allows the tires time to cool, as you remember is necessary.) Don't eat too much while on the road. A too-full stomach just creates a drowsy feeling, and *that* you don't need. Stop early in the day. Don't drive until 9 or 10 p.m.

So that's it. This overview of trailering has necessarily been brief. There is much more you'll have to know. So, we'll say it one more time: Read the manual. Also, there are many trailer clubs around that will help you. And visit the library for books on trailers. And the newsstand for magazines on the subject. See? We told you it was complicated. But it's also a lot of fun. Believe it.

BEFORE HITTING THE TRAIL

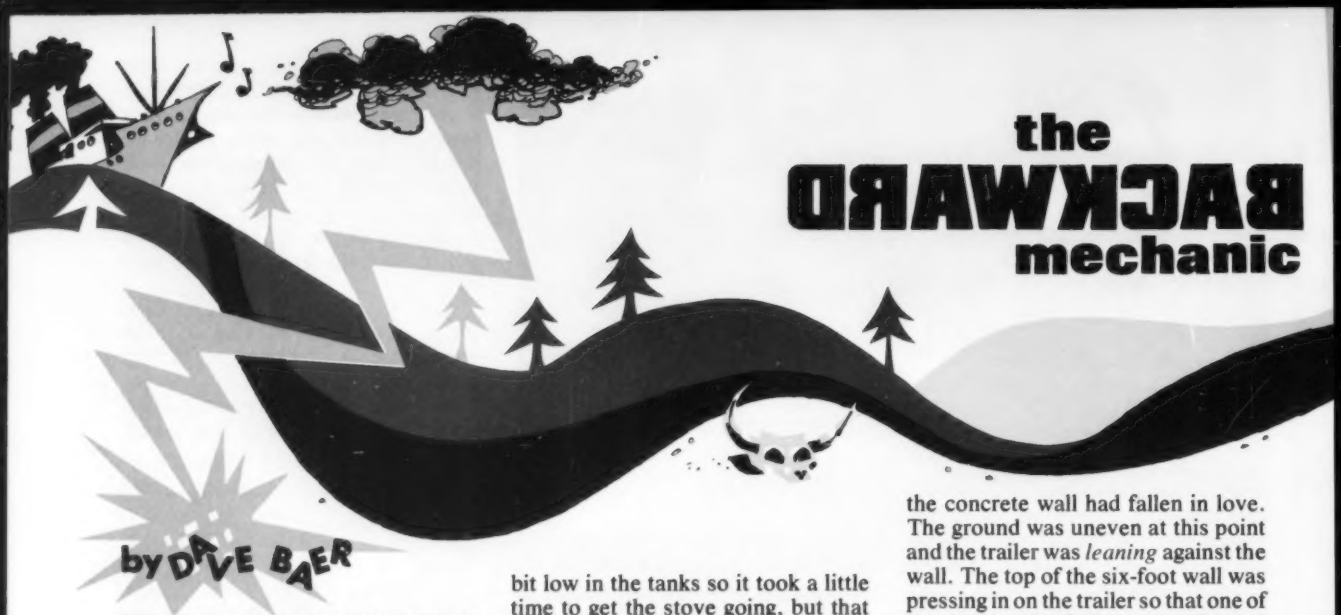
There's nothing more annoying on a trip than to start out and realize you've forgotten something. Here's a checklist of things to do before you take off.

TRAILER

■ Electric, water and sewer lines disconnected, stored. ■ Holding tank valve closed ■ LPG (liquid propane gas) bottles secure, gas turned off. ■ Counters and tables cleared ■ Cabinets and closets closed, latched ■ Refrigerator door, storage compartments secured ■ Vents and windows closed, secured ■ Interior lights out, water pump off ■ Separate 12-volt system off ■ Window shield, awning and antenna down ■ Door locked, step retracted ■ Last-minute check around trailer; everything stored/secured.

CAR

■ Check all fluid levels, including batteries, radiator, engine oil, power steering, brake and transmission fluids ■ Check trailer coupling, hitch, safety chains, electrical and brake connections ■ Connect auxiliary battery (recharges while you travel) ■ Tighten wheel lug nuts ■ Check tire inflation ■ Check running, brake and signal lights ■ Adjust mirrors ■ Test trailer brakes ■ Check warning bulbs, gauges



the BACKWARD mechanic

by DAVE BAER

I am an optimist. If things aren't going well, I always believe they'll get better. If they just get worse, I always insist it's only a temporary situation. If they continue to deteriorate, I just shrug, smile, and say "Just one of those things. It can't last."

My last camping trip may have cured me of that frame of mind.

Back in 1977 I had a camper. The space disappeared when my two children got larger, so I decided to get something a little larger to travel in.

Taken for a ride: After a few runins with hand-rubbing salesmen, I realized that my vision of a magnificent 35-foot trailer was impractical. I had only 20-foot money. So I downscaled my dream and finally found a used trailer that would meet our needs. It was a 20-footer with sleeping accommodations for four, a four-burner stove, a toilet and a shower. The owner gave us a ten-minute walk-around of the trailer. He said it was late and his dinner was getting cold, so he'd give us more detailed instructions later. I should have suspected something, but we bought the trailer.

A few days later I had my Blazer, complete with new hitch, and the travel trailer. That weekend I took my wife Dee and my son and daughter out for a short trip to test out the trailer.

We were immensely pleased with our purchase. It was great. Of course, the water didn't work, but we thought we could get that fixed at a trailer camp. And the propane was a bit low in the tanks so it took a little time to get the stove going, but that was minor. And there was no battery on the trailer so we had no electric power on the road, but we had plenty of lanterns from our camper days. And it was a little hot in there because there was no air conditioning, but we thought we could get that installed later. What's more, the short-wheel-based Blazer was a little squirrelly with this trailer, but not too bad.

Like I said, I'm an optimist. I was so pleased about the new trailer that I ignored all the signs of lurking disaster.

Backing and braking (breaking?): We went ahead with our preparations and had a new roof-top air conditioner installed. The salesman hooked it up to the store by a long extension cord and the unit ran for a little while, cooling the interior of the trailer nicely, before it shut down. The salesman explained the extension cord was too long and wasn't designed to carry that much of a power load. Of course, I believed him.

Finally the big day came — the first day of a one-week camping expedition with our trailer. I was ready. I had the trailer packed and balanced.

After several attempts to ease the trailer out of the backyard, I thought I had it licked. I was moving forward very slowly when I looked in the mirror and saw my horrified son with his hands over his mouth. I stopped and asked him what was wrong.

"You're kinda close to the wall," he said. I asked him how close.

"*Real* close."

I got out and went back to the trailer. It looked like the trailer and the concrete wall had fallen in love. The ground was uneven at this point and the trailer was *leaning* against the wall. The top of the six-foot wall was pressing in on the trailer so that one of the louvered windows was bowed inward.

I jacked up the side of the trailer and placed boards under the wheels on that side. By unhitching the Blazer to change the angle of backing, I was finally able to get enough space to pull the trailer out. I am not only optimistic, I am also very patient.

Shake-down cruise: I packed the wife and kids into the Blazer and we took off. We got less than 10 miles before we had the next problem. As we drove up a ramp on a freeway interchange, the trailer got more and more unsteady and then started to fishtail. I slowed and the trailer settled down. I got off the freeway at the next exit and discovered one low tire on the trailer. I pumped up the tire with a Coleman air pump that powers off the cigarette lighter, and we were under way again.

We traveled only about 75 miles, to a small camping area. It was dark by the time we arrived, so we went to bed. It was the last good night's sleep I would have.

The next morning we began to find "little things" about the trailer that caused us trouble. Actually, it was like a colony of gremlins had taken up residence.

First we tried to attach the hose for the water supply. There was nothing to connect it to. We found that with this particular trailer (an older model) we had to carry our water supply with us and use a small pump to supply the water pressure. There was no way to connect to the camp water. So I turned on the pump. It didn't work.

on TRAILER ing

Or, the voyage of the Andrea Doria

There was no way to repair that, so I shrugged it off. I decided to hook up the trailer to the camp electrical power. I was pleased to find that there *was* a cord for this purpose.

However, the plug on the trailer didn't match the outlet in the camp.

I was annoyed, but I shrugged this problem off too. There was a general store near the camp, so I unhitched the Blazer and drove there. I bought an adapter plug — at very inflated prices of course. The owner had a captive clientele.

When I hooked up the power the adapter promptly fried itself. It tripped all the circuit breakers in the trailer. I reset the breakers, checked out all the wiring and the adapter and found nothing wrong. When I hooked it up again, it worked. We had power!

Conditional air: A sense of accomplishment made me eager to try out the air conditioner. It worked beautifully, cooling the interior of the trailer a full 15 degrees in five minutes.

But that's all we got.

After working for five minutes, the air conditioner tripped the circuit breakers and shut itself off. I was getting wise now. I rechecked the suspect plug but found nothing. So I rechecked the wiring, reset the breakers and turned the air conditioner back on.

It worked for another five minutes and then threw the breakers again.

Finally, I tried turning the air conditioner to about half power. This worked for about an hour. For the rest of the week, we averaged 30 minutes to an hour of cooling each day before the air conditioner took a nap.

I made a mental note to see my smiling air conditioner salesman the moment I got home.

Drained: We set about hooking up the water drain from the trailer, only

continued

the purchase

the backward mechanic

continued

there wasn't a drain hose when we opened the back of the trailer.

So I drove back to the general store for a hose. But the drain hose didn't fit the drain hole at the campground.

I had a little trouble understanding that one. *Their* special drain hose didn't fit *their* special drains. But rather than puzzle too much over it, I organized a bucket brigade to supply us with water. We used the water to wash our dishes and then *poured* the water down the drain holes.

Then I went to start up the refrigerator to keep our food cold, and I had my first success of the day. Or maybe *half* success. The refrigerator was designed to work on either gas or electricity. The gas didn't work, but the electricity did.

the trip

Buoyed up by that minor victory I thought I might make it. Until I saw the flat tire.

The tire that had been low on the highway had breathed its last. There wasn't a chance of pumping it up with the Coleman pump now. It was a goner.

At this point, a voice an inch to the left of my right ear spoke to me quietly: "Dave, this trailer is a lemon. If you don't get away right now, it will take you down with it."

Flushed: I gazed longingly at my Blazer. It was the only thing that hadn't failed me on the whole trip. I wanted to climb into it and drive away, leaving the trailer, my wife and my children behind.

But first I had to visit the bathroom. I knew the toilet worked, but we were missing a couple of items, the special bio-degradable toilet paper and the special chemical that is used to flush the toilet. So it was back to the general store. The store owner had taken to smiling and saying "Bye, Mr. Baer; see you later," as he fingered through the growing pile of my money in his grubby little cash register.

Back at the camp, we discovered a *really* grim fact — although our quick, 10-minute tour through the trailer had included instructions on the operation of the toilet, none of us could remember just how it was done. And the owner had given us all the instruction booklets *except* the one for the toilet.

This left us with the old routine we'd had when we owned that crummy little camper — using the johns at the campground, and fighting off bugs and assorted reptiles in the night.

Tired: I decided, in a desperate attempt to accomplish *something*, to change the tire on the trailer.

I opened the rear compartment of the trailer to get at the spare. It didn't look right. I compared it with the tires on the trailer. It was the same width, but it was shorter than the others. Another case of "the curse of the older trailer." The owner, we found out later, had been unable to get the same size tire for the trailer because that size wasn't made anymore, so he'd purchased one as close as he could find. Of course, he'd never had to use it and we did.

I grabbed the lug wrench and tried to loosen the lug nuts. It was the wrong size. I ran to the Blazer and found its lug wrench. It didn't fit either. I still wasn't beaten; I had a four-way lug wrench. Surely one of the ends will fit these nuts, I thought. One of them did.

Unfortunately, this was a *small* four-way. Try as we might, we couldn't get the lug nuts to budge, even using extensions on the wrench.

I think the Jolly Green Giant must have tightened those lug nuts on that wheel. Either that or they'd been *welded* on, I'm not sure which. I went to get a cold drink and sat down to try not to cry into it.

Done in: Then my son decided to set up the trailer's awning, to keep some of the heat away. The awning and its framework were all there, and the

owner said a *child* could put it up. It took both of mine to do the job, and the frame looked like a Tinkertoy set designed by a mad inventor.

By nightfall, we had it all set up.

Dee, standing there with a tear in her eye, had had it. "Don't worry, hon," I kept saying. "It'll all work out." I don't think she believed it, but then I didn't either. There we were with a trailer with no air conditioning, no running water, no toilet, and a flat tire. What's more, even though the stove would eventually light, once the gas dribbled down far enough to reach it, it was too hot to cook indoors. Fortunately, we had brought along the little propane-powered Coleman stove. So we were basically living outdoors, venturing inside only to get food (which we cooked outside), or to get a few hours of fitful, sweaty sleep.

No, I didn't believe it either.

We cooked our evening meal outside on the Coleman, ate in silence, and went to bed. The next day I refused to do anything. We went down to the lake to try to go fishing, but we didn't catch anything.

The following day was more of the same, with us trying to use the air conditioner, and it going out to lunch after half an hour. My optimism had died sometime during the last three days, and I wasn't about to try to revive it.

Four wheels and a tire: However, the following day, I was determined: We were going off-roading, no matter what. We drove for three hours before we found a place to get off the road. Then we drove three hours back to camp and arrived after dark.

The next morning we began to break up camp — a considerable task when you remember we were doing everything but sleep outside. An auto club serviceman changed our tire and warned us we'd have to get a proper-sized tire as soon as possible.

Having wasted two hours waiting for him, we were afraid we'd be late getting home. Instead of carefully packing and balancing the trailer as we had for the trip out, we more or less threw things inside for the drive home.

This was a bad mistake.

On the way home we stopped only once, for some ice for our food. We knew we were behind schedule, so we didn't see to the tire at that stop. We decided to push on for home on the small one.

This was another bad mistake, one that almost prevented us surviving the vacation.

Trailer rhumba: I was very careful on that drive, alert for anything strange in the trailer's movement. It was riding quietly and smoothly. I felt reassured, sped up to 55, and still the trailer was sailing along without a tremor.

Of course, we were on a freeway smooth enough to rollerskate on.

Then we got to a bumpy four-lane highway, patched and repatched with asphalt. The traffic was slower and there were stop lights, so I began to watch traffic more than I was watching the trailer. Only then did the tail of the trailer whip to one side.

continued

continued

homeward ho!

It caught me cold. I was relaxed and I wasn't expecting anything. I was in the left lane in heavy traffic, with cars ahead, behind, and to the right of me. For a second or two I did nothing, while the trailer fishtailed two or three times, wider and wider with each swing.

I started to go for the Blazer's brakes when I remembered that was the worst thing I could do. I hit the trailer brakes full on. They caught hold and we were jerked to a stop in the median between the two directions of traffic, lost in a cloud of dust and gravel.

We sat for five minutes, shaking.

Finally, a break in the traffic enabled us to get back on the road, and we moved along at 25 to 30 miles per hour.

Trailer stew: Somehow we got back to our hometown alive. I thought the nightmare trip was over. I should have known better. When I opened the door of the trailer, I realized why I should have packed the trailer more carefully

Everything had dumped onto the floor of the trailer. We had everything from pots and pans to broken jars of peanut butter and pickles to sleeping bags and toilet paper, all in one disgusting mess on the floor.

Right then and there I had the name for our trailer. I intended to have it painted on the back the first chance I got:

THE ANDREA DORIA

Epilogue: I have a few items of advice for anyone who decides to look into the pleasures — there *are* some — of trailering.

Before you do anything else, talk to some professionals on recreational vehicles. They know what to look for and what can go wrong.

When you're looking at a trailer — especially a used one — check out *everything*. Know what it has and doesn't have, what works and what needs repair. Don't find yourself in the position I was in — getting surprise after surprise, all of them unpleasant.

Test-drive any trailer *before* you buy it. There was very little on this trailer that worked when I bought it, and it cost me a bundle to have things set right later. By the way, I discovered that my new air conditioner was the only thing that *did* work. The problem I had at the camp was most likely a severe power overload on their systems, caused by too many campers using too much power.

Take the trailer and tow vehicle to *professionals* (note the emphasis) to have the hitch installed, or to have it examined if it's already installed. This is extremely important. I consulted experts on the trailer's sway problem and found that its antisway devices were installed incorrectly. I had newer, better equipment installed. Not only that, the hitch on the Blazer had been installed at the wrong height. We were lucky we didn't have a serious — perhaps fatal — accident.

Make sure your wiring, plumbing and everything else is up to date for the parks you'll be using. Remember the frustrations I went through.

Get some sort of safety latches for all the cabinets in your trailer. It could save you from washing Bisquick out of your down sleeping bags.

Oh, you wonder about my optimism? Yes, I'd say I'm still an optimist, but now I'm a lot more careful, a lot less gullible and probably a lot better off for the experience. So you could call me "an optimist with a strong streak of realist." Believe me, it's safer that way.

too CLOSE FOR COMFORT

People say experience is the best teacher. Maybe so, but in the case of accidents we have to survive them in order to learn from them. It's easier, cheaper and less painful to learn from the experiences of others — their mistakes and how they corrected them, their close calls.

I am starting a program this month, asking you to share your traffic experiences with the rest of us. I'm calling the program "Too Close for Comfort" and I'm looking for real-life experiences in driving and riding and how you handled them. When we have an accident, we can only guess what might have averted the mishap. But when we have a "near thing" we often know exactly what we did right that prevented the accident from happening.

Last summer I started a similar program in *Flying Safety* called "There I Was," and the response from flight crews has been good. I think drivers and motorcyclists can benefit from telling "war stories" just as much as pilots can.

I emphasize that this is a voluntary, *anonymous* program. I'm not asking for your name, just your experience in your own words. There will be blank forms available with the heading "Too Close for Comfort" at the top. Just fill out the form with your experience, fold and staple it and mail it to me. The reverse side of the form is preaddressed to the Director of Aerospace Safety. Don't sign it, and don't give your organization name or symbol. Above all, don't worry about the presentation. I know most DRIVER readers don't have typewriters or a lot of journalistic skills. Just be sure to write clearly enough that I can read it!

I will personally read each form. If your experience teaches a lesson that we all can use, it will be printed in DRIVER's new "Too Close for Comfort" feature.

Sample forms will be sent to safety offices in the next issue of the *USAF Safety Journal* for reproduction and distribution locally.

Think back over your driving and riding experience. Some incident that happened to you, a close call you had, a mistake you made just might teach someone else a life-saving lesson. And that's what this is all about. Helping each other. I hope to hear from you.

LELAND K. LUKENS
Brigadier General, USAF
Director of Aerospace Safety

One of engineering's nine challenges

Safe 1 2 3 4 5 6 7 8 9

The North American steel industry gained attention at the 1981 SAE Congress and Exposition by showing five car bodies that are examples of the latest in lightweight vehicle design. All-steel from roof to floorpan and from hood to rear deck, these are not special one-of-a-kind designs but standard domestic production 1981 models of (left to right) American Motors' Concord, General Motors' X-car, Chrysler's K-car, Volkswagen's Rabbit and Ford's Escort/Lynx.

A cutaway of the 1981 Ford Escort/Lynx was on display to show some of the many aluminum parts contained in the car, including the aluminum bumper, air cleaner, heat shields and transmission case. With air conditioning, automatic transmission and four optional aluminum wheels, the car contains 200 pounds of aluminum, or almost 10 percent of its total weight.

SAE The Engineering Resource For Advancing Mobility

SAE says improving safety in self-propelled vehicles is one of the nine challenges facing engineers as we head for the 21st century. The other challenges are energy, environment, materials, productivity, design ingenuity, credibility, interaction, and education. Our Technical Editor talks here about some of the things he saw and heard at SAE's International Congress, where all the challenges were on the agenda

SAE? Isn't that the Society of Automotive Engineers? Yes it is, but as part of the organization's new image the words are taking a subordinate role to the letters, S-A-E.

SAE has an image and identity problem, especially with people outside the engineering community who assume the members are concerned solely with the engineering of automobiles — and probably only those built in Detroit. This misunderstanding may be the result of press abuse of the term "automotive." News writers seem to believe that "automotive" and "car" are the same thing. Actually, "automotive" means "self-propelled," and that's what SAE means by the word.

To more accurately project its concerns with all forms of self-propelled land, sea, air and space vehicles essential to man's continuing *freedom through mobility*, the organization is using its initials as the major portion of the signature and adding the phrase, "The Engineering Resource for Advancing Mobility."

One of the SAE's most visible platforms is its annual International Congress and Exposition held in Detroit. This year, 28,000 engineers, designers, manufacturers, specifiers and vehicle users participated in the five days of intensive technical information and product developments exchange. This year's theme was "The 80s — Decisive Decade for Global Automotive Technology."

During the Congress there were more than 150 half-day technical sessions. Typical of the regular sessions that looked at technical subjects on a global basis was a two-part program from the Materials Conference, "Worldwide Application of Plastics." This session included presenters from West Germany, France, Italy, Austria, Japan, England and Australia.

The coverage of multi-materials included five half-day sessions with several program committees having joined together to present sessions on Energy Absorption/Crashworthiness, Bumpers and Springs. For example, the Material Energy Absorption and Crash Energy Management session covered the capabilities of some materials and explored the National Highway Traffic Safety Administration (NHTSA) standards. The bumper sessions included papers on steel, aluminum and plastic bumpers followed with a panel discussion.

Electronics continues to play an important role in helping engineers deal with the restrictions imposed by the forces of energy, environment, economics and government regulations. Because there is a need to educate both the automotive engineer who is not familiar with electronic applications and the electronic engineer who needs to understand automotive applications, there were 12 sessions in this area, nine of which were part of a special conference. Topics included: Electronic Engine Management and Drive-line controls, Electronic Controls and Information Systems, and Sensors.

There was also a conference on electric and hybrid vehicles that included six half-day sessions with more than 25 individual presentations on the state-of-the-art in these vehicles.

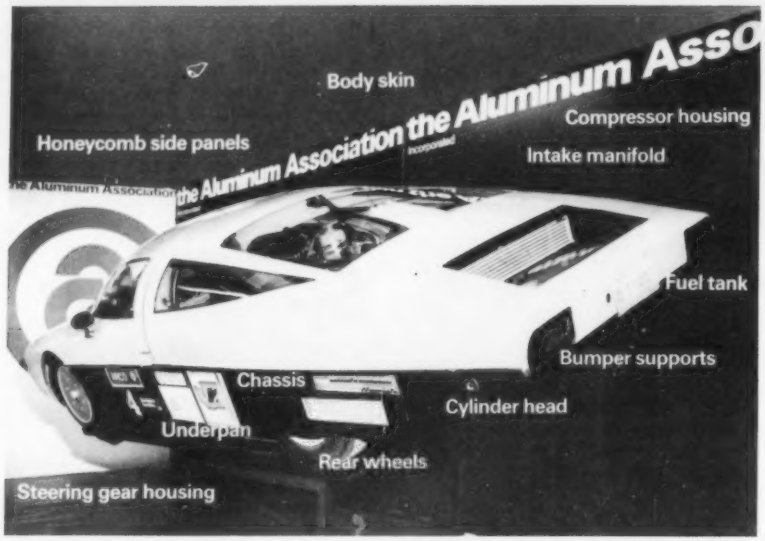
Then there were numerous strong technical sessions in the following important areas: Combustion and Emissions, Components, Commercial Vehicles, Diesel Related Subjects, Fuels and Lubricants, Manufacturing, Powerplant Engineering, Safety, Tires and Wheels. Some of these complicated subjects required more than a dozen separate sessions each. Then there were special sessions on such matters as Body Design, Aerodynamics, Combat Vehicles, Acoustics, Motorcycle Braking and Mopeds.

The Exposition which complemented the Congress included over 80,000 square feet of educational displays and features. At least 25 percent of the space occupied by more than 280 exhibitors included products and services originating outside the United States.

Among the overseas exhibitors were a number of large joint ventures, some sponsored in part by their governments. Included were joint ventures from Italy, the United Kingdom, Sweden, France, Japan, and, for the first time, Korea. There were also a number of overseas com-

continued

The auto industry's first standard motorized shoulder belts were featured in the DuPont exhibit. Displayed in a working section of the framework of a 1981 Toyota Cressida, the system relies on the DuPont Company's "Dymetrol" elastomeric tape for the shoulder-belt drive mechanism. It is activated automatically, moving forward and out of the way when the door is opened and returning to a comfortable position diagonally across the chest and shoulder when the door is closed.



Experimental, aluminum-intensive 1,350-pound Viking IV demonstrates some practical applications of the light-weight metal. Equipped with a diesel engine, the two-seater averaged 87.5 miles per gallon on a 4,500-mile cross country trip. The vehicle was designed and built at the Western University Vehicle Research Institute.

(above, left)
The world's widest use of flexible body components on a production automobile highlighted the Mobay Chemical Corp. display. The 1981 Porsche 924 Carrera GT is equipped with four fenders, front spoiler and two rocker panels made of glass-reinforced polyurethane by the reinforced reaction injection molding (RRIM) process.

panies exhibiting on their own, including several from Germany.

Exhibitors included Original Equipment Manufacturer component manufacturers for ground vehicles, materials suppliers, distributors of engineering equipment, goods and service, and suppliers of engineering software and testing services.

Products exhibited included: new applications for aluminum and steel; new plastics and plastic components; light-weight, high-strength composite fibers; and other related material items. Heavy emphasis was placed on instrumentation, computer-assisted design tools, automotive components, lubricants, measurement devices, fiberglass products, nickel-chromium plated metals, rubber products, semiconductors, electronic components, lighting products, tubing and fasteners.

Safety in the spotlight: Safety came to the forefront during technical sessions titled: Automobile Interior Flammability; Manufacturability of Research Safety Vehicle (RSV); Anthropomorphic Test Dummies for Multi-Directional Impact; Crashworthiness; Vehicle Signal and Marking Systems; Fatal Traffic Accidents; Passenger Protection; and Motorcycle Braking.

The RSV session, for example, noted that if the technology from the programs were incorporated into the entire U.S. car fleet, about 10,800 lives would be saved each year, and nonfatal injuries would be reduced by 24 percent in side impacts, 18 percent in front-end impacts and by 29 percent in rear impacts. The rear of the RSVs is designed for 50 mph impact protection and can withstand a five mph rear collision without damage. The soft front structure is designed for 40 to 45 mph barrier impacts, protects pedestrians in impacts up to 20 mph, and withstands eight mph barrier crashes without damage.

However, the three major builders of RSVs — Chrysler-Calspan, Mini-

cars, and Renault along with the Graduate School of Business at the University of Michigan — have all studied the marketability of the RSV and have drawn the same conclusions. With an initial investment approaching $80 million, RSVs could be sold with a 20 percent premium price tag in the range of 20- to 30,000 vehicles per-year, but not in the 300,000 per-year range necessary for most major manufacturers to consider the project as profitable.

Another safety item was reflected in two studies. According to the studies, a centrally-located, high-mounted auxiliary brake light can reduce rearend accident rates by more than 50 percent. Half a 5,400-vehicle passenger car fleet that logged 55 million miles during a 12-month period were randomly equipped with the brake lights. The very good results might be even better under less controlled circumstances because these drivers in the test were "responsible persons driving in pursuit of their business primarily during business hours. Also, the sample contained very few drivers under age 20 and over age 55."

Another safety announcement coming out of the sessions was that three of the biggest motor pools in America are converting to silicone brake fluid. Reduced maintenance, longer service life, long-term storage and added safety were cited as advantages. The safety improvement was measured by nonoccurence of fade or spongy pedal caused by boiling brake fluid as well as better response time under cold weather conditions. The U.S. Army and U.S. Postal Service were focal points of the breakthrough in brake fluid applications.

Maintenace neglect: On the dim side of safety news was a report that personal transportation in this country is bordering on disaster from lack of service, even though two-thirds of a recent service customer survey poll gave auto service shops the highest possible ratings on work performed. In past hard financial times, auto service business actually increased as people made what they had last. This has not been the case in the current recession and the auto service industry pictures mass failure of personal vehicles in the near future.

Claiming that there are not enough service facilities available to rou-

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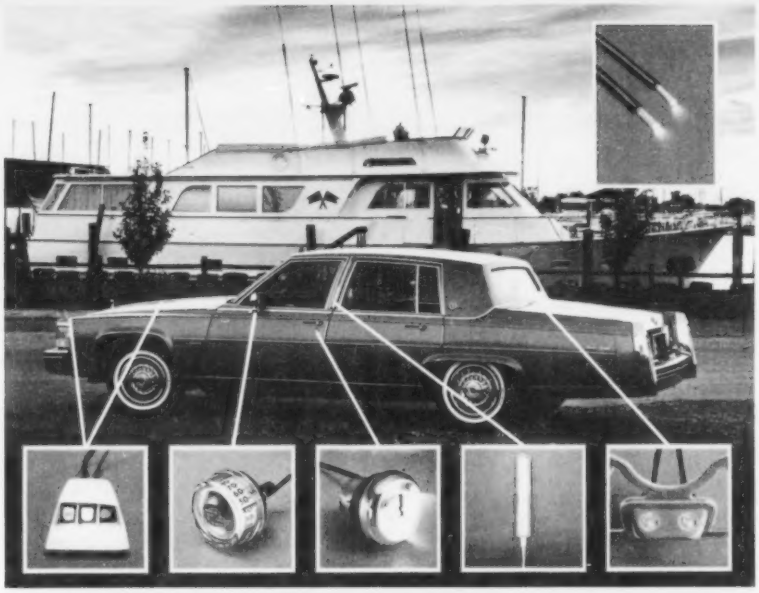
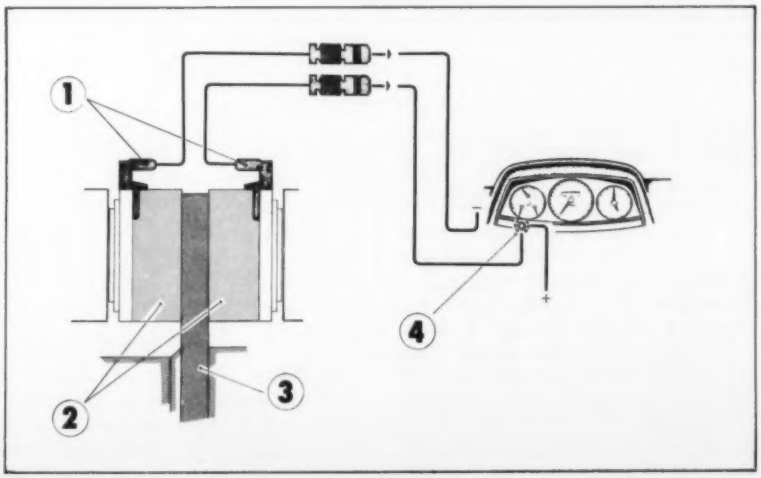
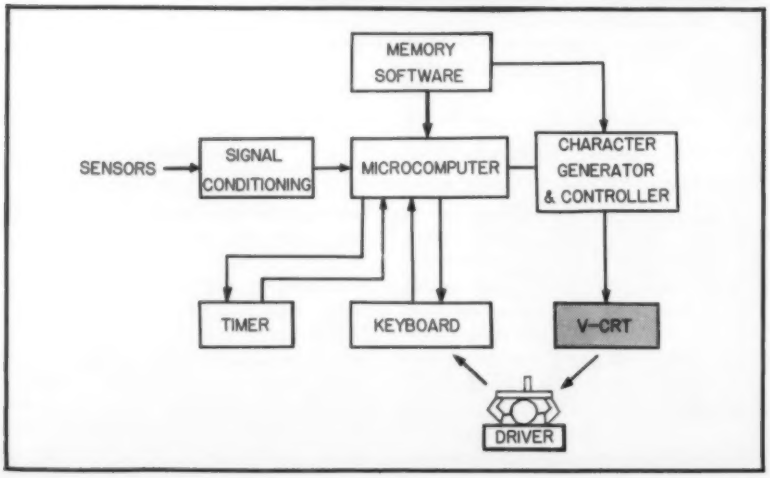


Safety and consumer convenience — at minimum maintenance — prompt the increased popularity of fiber optics by the auto industry, according to DuPont spokes-persons. Here are five applications of DuPont "Crofon" fiber optics for current Cadillac models (left to right): headlamp monitors, illuminated outside thermometer, lighted key lock, opera light, and tail light monitors. Improved styling is an added benefit, because "Crofon" directs light (inset, upper right) to areas of the car where separate bulbs would be impractical.

(left, below)
Four sensors are embedded in the front wheel brake linings on all current Mercedes passenger cars. When the lining (2) is worn to a minimum safety level, the sensors (1) come into contact with the disc brake rotor (3) and activate a warning light (4) on the instrument panel.





(above, left)
This new instrument panel display, Zenith's vehicular cathode ray tube (V-CRT), is a compact, flexible "free format" monitor which presents data and graphics sharply and clearly. Designed to appear in mid-1980 autos, the panel displays such operating data as speed, fuel, coolant levels, temperature, and oil pressure, as well as time, turn signals, headlights, etc. in six colors. On push-button command, the monitor can also display such data as miles-to-empty; estimated time of arrival; maps, travel information; and diagnostic and service information.

tinely service this country's vehicles, the service industry foresees long waiting periods extending into months when the unmaintained vehicles finally grind to a halt.

But we didn't hear much enthusiasm for "doing it yourself." Even the tool side of the industry tends to view do-it-yourselfers as "ruin-it-yourselfers" because they don't possess the proper background, training and readily available technical information. (See "The Backyard Mechanic" on page 24)

On energy and environment fronts it is the same "old" news about under-inflated tires, but there are some bright "new" horizons from such areas as multigrade gear oil, hybrid autos and engines that need no oil.

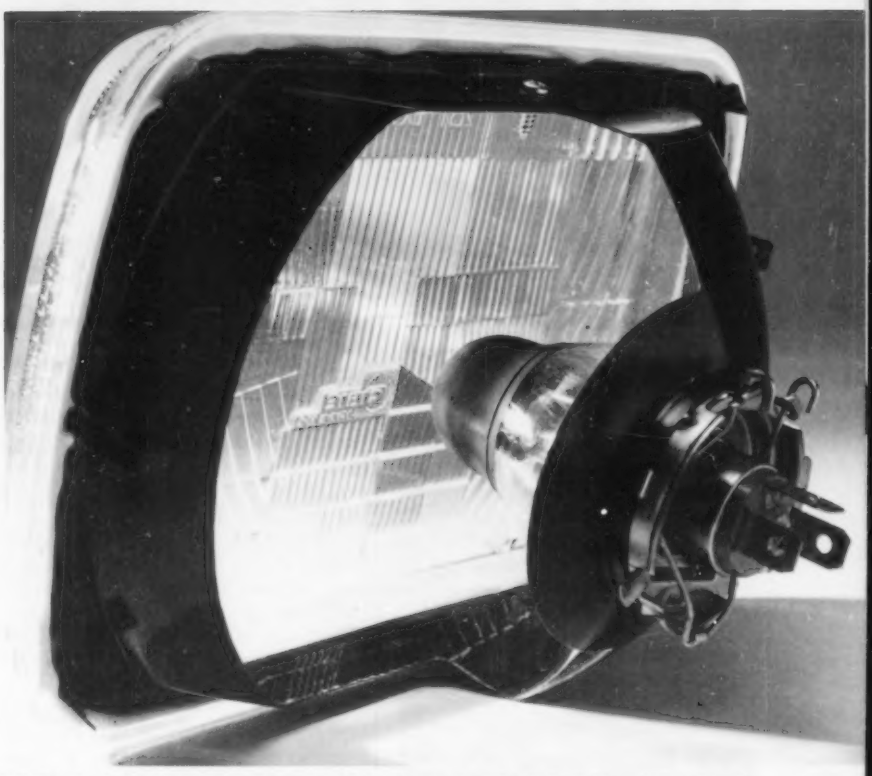
American studies show that on the average, tires are underinflated by about two pounds per square inch, costing the nation about 600 million gallons of fuel annually. In Canada the studies show that 70 percent of the tires were underinflated, with 37 percent being underinflated by at least four psi.

Meanwhile a two-year, three-million-mile test of heavy-duty trucks found as much as a five percent better fuel economy when using a multiple-weight SAE 75W90 gear lubricant instead of standard SAE 90 oil.

High fuel costs may lead to hybrid vehicles (available at about a $2,000 premium) by the mid-1980s. In addition to having a conventional internal combustion engine, they will also be propelled by a battery-powered electric motor. Hybrids could save between 50 and 80 percent of the petroleum fuel used by a conventional auto.

Designed to allow researchers to carry out special visual studies dealing with combustion process, emissions measurements and fuel experiments, a transparent engine has been built that is oil-less. This design represents the potential for a low-maintenance engine which also produces a low level of emissions.

Diesels still big: Gauging from other technical sessions, diesels are still heading toward their peak as the wave of the future. Currently, the average diesel car operates on 44 percent fewer fuel dollars than a comparable gasoline model because of its higher mileage and lower cost of diesel fuel. Diesels have already contributed about 10,000 barrels per day in total automotive fuel savings for 1980, with national savings projected to increase to 320,000 barrels per day by 1990.



BOBI is the first sealed beam halogen headlight with a replaceable bulb. Designed to conform to NHTSA standards, BOBI (an acronym for the phrase *"bloc optique a ballon incolore")* is currently available in the 200 mm large rectangular size only. Manufactured by Cibie, BOBI was part of a large French national display.

Furthermore, diesel development continues with future diesel engines having spark plugs and being able to run on a wide variety of fuels. Fuels of the future include methanol, ethanol, gasoline, diesel fuel, peanut oil and sunflower oil. Tests to date with the latter two crude vegetable oils have been conducted without additives and no further refining or degumming.

Meanwhile, current problems such as the rattling noise known as "cold knock" are being tackled. For example, circulating some exhaust gas back into the combustion chamber reduces idling noise levels by about seven decibels.

Safety, energy, environment, materials, productivity, design ingenuity, credibility, interaction and education are big challenges that SAE has accepted with its new goals statement. However, Philip J. Mazziotti, 1981 SAE president and Joseph Gilbert, SAE secretary and general manager, agree that the SAE must be constantly alert to needed changes in its structure, programs and service in order to deal with newly emerging societal, technical and educational challenges.

Engineers must be responsible to the public as well as to the government. But at the same time, engineers don't decide what will be built. That is a commercial consideration. Yet engineers must speak up when the public, government or commercial demands are contrary to the laws of nature.

safety SELLS

AMERICA TAKES UP THE CHALLENGE

Last year in the United States just over 25 of every 100 new cars sold were foreign-sponsored imports, according to F. James McDonald, General Motors Corporation president. "And, of those 25, all but three were classed as small cars. That means about 22 percent of all new car buyers — 2.1 million customers in the United States in 1980 — believed that quality or fuel economy or price in a small automobile could best be delivered by the foreign manufacturers or they had the availability."

The small car issue is a double-edged razor. It cuts into more than our national economy — it also affects our traffic accident experience. Small cars are not as safe in accidents as large cars. This is true not only when large and small cars collide but also when small cars collide with other small cars. Small cars can't absorb as much impact energy as larger cars, and don't let anyone dazzle you about how small cars handle better and enable you to avoid accidents. Small cars *can* handle better, but not all of them actually do.

Interestingly, the American car buyer is beginning to ask questions about what auto features may be unsafe. For the first time, Detroit automakers are saying publicly that safety affects sales. Pontiac General Manager William E. Hoglund puts it this way: "The absence of safety is a real negative, more than safety itself is a positive." So, as long as safety is a sales force (or the lack of safety hurts sales, depending on how you look at it), dollars are going to talk and world automakers are going to pay attention.

The Japanese and European automakers have taken off their gloves, so to speak. Detroit's traditional leadership has been challenged, and the American companies aren't taking it lying down. The duel is set and the weapons will be small car sales.

It is no surprise that the subcompact market is the fastest growing segment of the auto industry. Since 1976, growth within the subcompact market has been explosive — in-

Chrysler's K-car clones, The Dodge Aries (above) and Plymouth Reliant (below), provide passenger room for six and deliver 25 mpg city, 40 mpg highway according to the EPA figures. Ride and handling are reported to be excellent.

For 1982 this is a new kind of Cadillac for a new kind of Cadillac owner. The Cimarron combines the size, ride and functional design of fine European road cars with the traditional quality of Cadillac.

Mercury's LN7, is a "bubbleback" sister to Ford's "notchback" EXP. Both two-seaters have received 29 mpg city and 46 mpg highway ratings from the EPA.

creasing from 21 percent of industry sales in 1976 to 39 percent in 1980. That's a 70 percent increase in just four years. If this trend continues, subcompact sales will account for 45 percent of the total cars sold by 1982. Combined sales of subcompact and compact cars totaled 60 percent of the 1980 market.

Subcompact/compact buyers are looking for "gas economy, dependability, durability, low maintenance costs, good workmanship, maneuverability, low price and good parts availability." What that boils down to is fuel economy and high quality. And high quality contributes to vehicle safety.

All cars sold in the United States are required to be crashworthy at 30 mph. When the government crash tested some new cars at 35 mph last year, the results were disappointing. Instrumented test dummies failed to "survive" in many of the small foreign cars. Most of these failing grades were recorded simply because *minor parts didn't do their jobs!* This is not high quality.

High quality begins with design and carries over to the customer via production. Quality-designed parts combined with quality materials in a quality assembly process delivers quality performance and sound transportation. Sound transportation must mean both the ability to avoid accidents and the ability to survive accidents that are not avoided.

Quality levels of the '70s aren't sufficient for the 1980s. To remain competitive with the imports, American cars are beginning to reflect customer demands for long-term durability, corrosion control, ride and performance. The American manufacturers are sharpening their acts on fit and finish. And this is all going to pay dividends for the drivers in terms of safety.

Last fall Chrysler introduced its import-fighting K-cars and Ford brought out its World Car. In March, Ford expanded the World Car with a sportscoupe model, the first of the 1982s. General Motors has also started the 1982 model year with the introduction of the J-cars.

Chrysler's K-car clones are the Dodge Aries and Plymouth Reliant. Ford's World Cars are the Ford Escort and Mercury Lynx with the Ford EXP and Mercury LN7 being 1982 models. General Motor's entries include the Chevrolet Cavalier, Pontiac J-2000 and Cadillac Cimarron. Oldsmobile and Buick will get their own J-cars in the spring of 1982.

continued

The new Jeep Scramble combines versatility with excellent fuel economy — 22 mpg city/27 mpg highway.

These new generations of American cars come with high levels of standard equipment just like their foreign competition. Additionally, they have brakes that deliver when asked, a comfortable ride and respectable handling. And they pass gas pumps with equal contempt.

The Environmental Protection Agency figures for the K-cars show 25 miles per gallon city, 40 mpg highway. The Escort/Lynx delivers 30 mpg city/41 mpg highway according to the EPA, while the EXP/LN7 have received 29/46 mpg ratings for city/highway mileage. At press time, EPA fuel economy testing hadn't been completed on the J-cars, but forecasts indicated that the city figures would range from 25 to 30 mpg with highway ratings in excess of 40 mpg.

But what happens when one of these small cars hits a solid object?

Well, as we said before, all new cars sold in this country must be crashworthy at 30 mph. Most automakers don't wish to comment about the government's 35 mph barrier tests until a set of criteria for pass/fail has been firmly established.

Pontiac's Chief Engineer Robert L. Dorn feels it is unfair to draw any conclusions based on a single crash of one model of one car. To date, the 35 mph crashes have been one-time tests. As R. W. Brewbaker, J-car Project Center chief engineer, pointed out when speaking of how American car makers conduct their own tests: "To assure body structural integrity and crashworthiness, considerable engineering effort is placed on structural analysis through computer simulation in addition to ½-scale and full scale barrier testing" of several different vehicles.

Even though the difference between the 30 and 35 mph barrier tests is only five mph, the force is 37 percent greater in the 35 mph crash. Similarly, with proposed 40 and 50 mph barrier standards, impact forces would be 78 and 177 percent greater than those involved in the 30 mph crash. However, because most crash impacts occur at 35 mph or less, the need for 40 or 50 mph standards may be cause for future debate.

World cars from Ford such as the Escort pictured here and its almost identical twin, the Mercury Lynx, started getting their jobs done as "import fighters" as soon as they hit the showroom floors. In their first three months on the market they outsold all 70 of the car lines imported into the United States.

Braking and handling characteristics of General Motor's new J-cars such as this Pontiac J-2000 are said to be above reproach even during extreme emergency conditions.

The 1982 front-wheel-drive EXP — the first two-passenger Ford in a quarter century — is a fuel-efficient sportscoupe with handling characteristics and styling meant to please driving enthusiasts.

Another standard that has been proposed is a Safety Rating Sticker similar to the EPA mileage rating stickers currently found on new car windows. The industry as a whole opposes such stickers until valid tests can be established. Chevrolet's Paul King feels that such stickers imply that mechanical dummies presently used in crash tests are the same as human beings, "which is unrealistic." ("The Car Book" recently published by the Department of Transportation explains how the mechanical dummies fared in the crash tests. A little red X with a head means the dummy "died," a little yellow Y with a head means it "survived." Needless to say, these graphics don't appeal to the car makers. Instructions elsewhere in this issue for how to order your free copy of "The Car Book.")

The competition among automakers, domestic and import, is real, and we consumers should be the winners. Better economy, better cars and, if we drivers do our part, safer commuting for all of us.

(right)
Aerodynamcs play an important role in fuel economy. Such refined touches as the optional deck lid spoiler on this Pontiac J-2000 hatchback improve the coefficient of drag from 0.407 to 0.392. There is approximately one mile per gallon gained for each 0.06 improvement.

(right)
Cargo volume in the Chevrolet Cavalier station wagon is almost 65 cubic feet — only 11 percent less than Chevrolet's midsize Malibu wagon. Yet with the option F-41 handling package the 1982 J-car station wagon rivals the best small coupes and sedans in handling and braking.

ruin it yourself:

The BACKYARD MEC

Dum-dee-dum-dum.

Dum-dee-dum-dum, DUM!

This is the city: Detroit, Michigan. Twenty-eight thousand people are here on automotive business.

My job: Bring back their safety stories. I carry a press card. I'm a technical writer for DRIVER Magazine.

It was 9 a.m. Tuesday. I received a complaint.

I was working the SAE International Congress and Exposition out of the News Room, room 3188 Cobo Hall. My partner, the Feature Editor, was sound asleep. He should have been; he was still in Southern California where it was only six in the morning. I wished I was sleeping, too.

Standing at the observation window I stared at the Solar Challenger — the sun-powered aircraft follow-up to the Gossamer Albatross. Under it spread more than 80,000 square feet of automotive exhibits. The window sill made a good table for my Styrofoam cup of black coffee.

I fussed with my tie. I never was comfortable in a grey, three-piece, wool-blend business suit, white shirt, regimental tie, black socks and black wing tips. My bell-bottom jeans, shop coat, Frye boots, white socks, Winnie-the-Pooh T-shirt and Porsche baseball cap fit and feel better.

Behind me three newspaper scribes perched on the edge of their chairs, leaning across a small coffee table where their beverages steamed in the small white cups. Their conversation was muffled, but pointed. Yesterday, the Equipment and Tool Institute executive manager had used a demeaning term for nonprofessional mechanics, they said. I made a mental note.

9:15 a.m. I moved across the room to one of the folding chairs in the back. I'd have leaned back against the wall, except there wasn't one. Just a curtain to keep traffic at the press registration tables from distracting attention during news conferences. Besides I couldn't balance my cup of coffee while leaning back.

At the lectern in the front of the room was a young executive. He introduced three men seated at a long folding table. The man in the middle was the suspect, Don R. Proven. His hands were locked in a clasp and his elbows rested on the edge of the table.

9:20 a.m. The press conference was in full swing. The WXYZ-TV videotape camera was recording while its bright lights glared off Proven's bald head. A radio newsman sat sideways in a second row folding chair, hunched over his tape recorder on another chair. Two reporters from Detroit's biggest dailies, the *News* and *Free Press*, looked at each other from the corners of their eyes. The guy from *Automotive News* glanced over a few press releases.

9:21 a.m. Proven zapped the do-it-yourself mechanics. Without blinking an eye, with malice aforethought and a very cold heart, he called self-service mechanics, "ruin-it-yourselfers." He seemed pleased with himself for having said it — almost as if he had personally coined the phrase.

9:45 a.m. The press conference broke up. I shadowed Proven into the hall. His bald head was easy to follow in the crowd of three-piece, grey business suits. Being extra careful not to spill his coffee, or mine, I backed him into a seat on one of the chrome and black vinyl doctor's waiting room chairs that made up the "International Lounge."

9:47 a.m. While the Detroit River flowed coldly by the large window in front of us, we exchanged pleasantries.

"I'm from the Air Force. We have a traffic safety publication, DRIVER . . . " I couldn't have picked a better opening.

"That's great," smiled Proven. "I just finished my weekend duty. I'm in the Marine Corps Reserve."

I'd already worked my way into his trust. But what was to follow wouldn't be easy. You see, I've had a couple of joint services assignments. I know it's easier to grab a bobcat's tail than pin down a Marine.

Faster than the flash from a timing light I opted for the direct approach knowing that Proven would see through any smoke I tried to lay.

"Nice," I panned back. "DRIVER has a do-it-yourself section about auto repair. We call it, 'The Backyard Mechanic.' "

"I think it is great for the Air Force to have a do-it-yourself program," Proven announced, still beaming.

"Yes, sir," I replied. Was he leading me astray?

"Your people have technical backgrounds," he continued. "They are used to doing things according to the book — following the instructions. I like it when I get to visit Air Force bases. Your people really know what they are doing. They're professionals. It's great. Really great."

"Yes, sir," I said. I was thinking to myself: Hold it! Who's buttering up who — or is it whom? I was almost ready to ask him to give me the facts

HANIC Case

— just the facts. But that would have tipped my hand too soon and he would have clammed up. I decided to try and steer the conversation back to the disparaging remarks about self-service mechanics.

"Not all our readers are technically trained," I lightly protested.

"But for the most part," Proven interjected, "they all do their auto work in an auto hobby shop."

"Yes, sir," I answered.

"There they get professional advice and, if necessary, help. There's a big difference between you military do-it-yourselfers and the guy working in his own driveway. A big difference."

"Right. But if the do-it-yourselfer is using a manual I don't see the difference."

"A technically-trained individual will do exactly as the book tells him. He won't skip a step because he doesn't think it is important. He doesn't skip doing a check because he doesn't have the right tool."

"Yes, sir."

"On the other hand, the average Joe doing the same job in his driveway is going to do only what he thinks needs doing. He'll skip all the checks and time-consuming steps.

"Take a brake job. The ruin-it-yourselfer looks at the pictures in your article and thinks all he has to do is loosen a bolt, pull the retainer and spring, slap in the new pads, pop it back together and he's in business.

"Even if he were to read about checking the rotor thickness, checking for parallelism and all the other 'little' things, he wouldn't do them.

"On the other hand, the technically-trained person will be sure to do everything that is called for. And at the hobby shop there's always somebody looking over your shoulder or asking, 'Did you do this or that?' "

"Yes, sir."

"But even then, there can be problems."

"How's that, sir?"

"There are problems only a professional knows about. He's the guy who's been working every day for 20 years with that type of car. Or he has been working on only brakes for 10 years. He knows about the little idiosyncrasies of the system.

"And when it comes to brake jobs, if one of those 'little' idosyncrasies goes wrong it is really dangerous."

Conceding Proven's point, I tried to turn the tables, "We've noted that a good counterperson in an auto parts store will question a customer enough to know if the do-it-yourselfer is qualified to do the job. And that counterperson can often provide helpful hints."

"True, but that parts *person* doesn't work on cars every day and isn't going to know all the idiosyncrasies like the full-time mechanic does."

"Yes, sir. How about the parts stores that provide clinics?"

I could see that he was starting to realize that I might pressure him over the ruin-it-yourself remarks.

"There's a guy who is so inept that he actually wrecks his car working on it."

"Yes, sir."

"It may cost him two to five times as much as he's already paid just to repair the damage he's done — if he can find a mechanic that is willing to undo the mess."

"Mind my coffee, sir. It's on the edge of the table."

"Then there's the guy who only does half a job. He may not kill only himself, but he may take you and me with him. Of course there are those who do a full job but don't know about some idiosyncrasy. They are just as dangerous."

"Yes, sir. Watch my coffee."

"Look, I represent the equipment and tool industry. Nothing would be better for us than to have a law that says everybody must have a complete set of tools. We'd make a bundle, but it wouldn't help anybody."

"How's that, sir?"

"Today's cars are very complicated. There's a major concern about having enough qualified people to service and repair them. For example, only three percent of all the complaints about fraudulent car repairs have turned out to actually be fraud. All the rest involved the mechanic just not knowing what to do or how to do it right."

"Yes, sir."

"And if we have that kind of incompetence with the people who

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make their living repairing cars, how can the shadetree mechanic hope to be able to work on today's vehicles?"

"I don't know, sir. Is there anything else?"

"There's a lot more. But basically, people still have to have some knowledge about how cars work and what repairs they need."

"Yes, sir. But today's cars are so complex, how can anybody other than a professional mechanic work on them?"

"All the more reason for people to be able to take care of what they can, but know enough not to tackle what they can't handle. For example, being able to change the oil and filter, but not touching the fuel injection."

"Yes, sir." I could see the accused was, in fact, the plaintiff. Sometimes you can't tell the players without a program. "Is there anything more?"

"Take a look at the Booz•Allen & Hamilton study: 'What You Always Wanted to Know About Your Repair Shop But Were Afraid to Ask — A National Survey of Owners, Operators, Mechanics and Consumers.' "

"Thank you, sir." I tasted my coffee. I was cold.

7:17 p.m., Saturday at 35,000 feet over Iowa. Westbound on American four-71. I'd finished my airline-style, TV dinner and was settling into the auto service shop study with a cup of coffee.

The SAE press release said that auto service shops and actress Bo Derek had something in common: they both tended to be rated "10." Of the 2,434 responses in the survey, 63 percent rated their service a perfect "10" and more than 85 percent rated it "8" or higher. Only eight percent of respondents rated their service at "5" or less.

"Does consumer age have any relation with satisfaction?" I wondered aloud.

The older the consumer, the more likely he or she was to be satisfied with the service obtained, I read in the study.

"How about family income?"

Families with a combined annual income less than $7,500 were found to be more satisfied than members of the general population.

"Does consumer knowledge have any bearing?"

Those who had just a little knowledge of auto repairs tended to be less satisfied, while consumers who were either "not at all knowledgeable" or "very knowledgeable" tended to be more satisfied.

The turbulence was getting rough on the flight. I had to watch that my coffee didn't spill.

"What about repair costs?"

Repair costs were found to have a negative effect on consumer satisfaction, with those paying higher bills tending to be less satisfied.

"Domestic versus foreign models?"

Domestic car owners were significantly more satisfied with their repairs than owners of foreign models.

"Does vehicle age play a role?"

Owners of older vehicles tended to be more pleased with the service they received.

"Hmmm. Is there anything the consumers seem to prefer?"

Consumers seem to prefer direct contact with either the mechanic or the service facility owner. Higher ratings resulted from consumers having some communication with one of these individuals. Significantly lower ratings were reported for the service manager/service writer arrangement in which the consumer is buffered from both the owner and the mechanic.

"Yes, I see. Is there anything else?"

In what is perhaps the ultimate reflection of customer satisfaction, 91 percent of the respondents said that they would return to the same service facility for their next repair job.

"Yes. Is that all?"

No, the automotive repair consumer is a loyal, quality-conscious individual who is very sensitive to personal repair counseling with shop owners and mechanics.

"Thank you."

The stewardess leaned across the two empty seats on my left asking, "Did you want something, sir?"

"No. No, just talking to myself," I mumbled as I reached up and turned out my reading light. She left.

I tasted my coffee. It was cold.

9:45 a.m. the following Monday. My partner and I entered building 918, Norton Air Force Base, California. I flung open the door to room 119. My partner opened his wallet and announced to the editorial assistant, "Badge FE — that's Feature Editor — we're here for the Backyard Mechanic." The woman behind the desk pointed to a long, conference room behind us.

I stepped into the room and did a sharp left right in front of a desk hidden in the corner while the Feature Editor blocked the doorway.

Flashing a slim wallet I said, "Badge TE — Technical Editor — you're under arrest."

"What's the charge?" came a gruff voice from the red-eyed sergeant behind the desk.

"The charges are: three-75. . . . "

"Three-75? What's that?"

"Providing enough knowledge to make people dangerous to themselves."

"Oh, yeah!"

That's, 'Oh, yeah, sir!"

"Sir?"

"Ok, kid. You'll also be charged with a dash-four-six-dash and . . . "

"Dash-four-six-dash?"

"Yes. Thats tempting people to tackle more than they can handle. You're also under arrest for nine-eight-17."

"Nine-eight-17? What's that?"

"Overwriting!"

"And you'll also be charged under code 12-31-45."

"Huh?"

I pointed to the empty coffee machine on the table next to his desk and looked at what was obviously the last of the pot, steaming hot in his tin cup and snapped, "Not having enough coffee for guests. Read him his rights, FE."

The trial was held in the Ultimate Court of Printed Media, in and for the readers. In another paragraph, the results.

The Backyard Mechanic was found guilty on the first three counts. He was sentenced to not less than four years, not more than 20 at preparing do-it-yourself articles that anybody can do, or consumer protection articles about what to look for when having somebody else do the job.

The defendant pleaded no contest to the fourth count and was given a suspended sentence.

The story you have just read is true. Some of the names have been left out to protect the innocent.

tteecc!h!h DOUBLE TECH Q A

With TSgt RON LATHROP

COMMENT: I've read in the newspaper about the various space capsules and also the Space Shuttle being coated on the nose with plastic to dissipate the terrific heat generated by air friction. Thus, since plastic is rustproof and there is high heat-resistant plastic available, what is holding up the commercial introduction of plastic mufflers and exhaust pipes for automobiles?

REPLY: Cost. Even at high mass-production levels the plastics you are talking about are extremely expensive. Besides, it takes a lot of oil to make plastics. Additionally, you can't build a product at a reasonable price if it can be sold only once.

Let's say for the moment that you are going to go into the business of making these plastic exhaust parts. The first year you make enough to go on all the new cars being produced and a third of the existing fleet. In very rough figures that's 10 million new cars and 33 million existing cars. By the third year because of scrappage and the increasing percentage of new cars that already have plastic systems, there are only the 10 million new cars to do and the remaining 16 million old cars. Of course in the fourth year all you can do is new cars. And the sales of new cars will be way down because the older cars now "last forever."

To complete the picture we'll assign reasonable unit prices. Those first two years when you are selling more than 40 million units a year the reasonable price might be $89.95. That's already an outrageous price, but it may be low when considering the costs of this high-temp plastic. The third year when you can market only slightly more than 25 million units, the price (excluding inflation and the increasing costs of already rare oil supplies) would probably be bumped to something like $119.95. From the fourth year on, when the market falls to less than 10 million units a year, the price would probably exceed $250 a unit not counting inflation!

So what you have is an item that is very expensive to produce becoming more expensive every year because of dwindling oil supplies and falling requirements. You've just started a business doomed to fail, plus you've put an entire after-market industry out of work at the same time.

On the brighter side, there are some low-cost, light-weight ceramics that auto manufacturers are eyeing for use as compressor shoes on air conditioning, pushrod tips, turbocharger rotors, lifters and rocker arms on diesel engines and precombustion chambers for gasoline engines.

COMMENT: Many times in DRIVER I have seen a statement that transmission fluid should be "sparkling red." This is how it looks when it comes out of the can but how do you keep it that way in the transmission? At about 25,000 miles, the normal mileage for changing transmission fluid, the old fluid has an off-red or brown color. If you change the fluid — dropping the pan and changing the filter — you replace only three or four pints of fluid, about one-third or one-fourth of the total fluid content of the transmission. The preponderance of old fluid immediately discolors the sparkling red of the new fluid. So, unless you drop the transmission to change the full nine to 12 quarts, you will never be able to have sparkling red fluid in your transmission again — or do you have another solution?

REPLY: You're right. How about my saying transmission fluid is normally red or maroon in color, so if the fluid looks dark brown it is due for a change. Also, if you've done a lot of heavy driving (towing trailers, short trips in hot weather, mountain driving, motoring in deep snow or mud, etc.) smell the fluid. If it smells badly burned it may be and requires replacing.

Secondly, even though only a small amount drains out, the replacement of that little bit is enough to revive all the transmission fluid — not to "sparkling red" but it won't be dark brown again until it's replacement time.

COMMENT: My wife and I are stationed in Germany and are planning on buying a new car when we return to the States. We would like the pro's and con's on the _____.

REPLY: May I recommend sending for a free copy of "The Car Book." This government publication is available by writing:

continued

The Car Book
Pueblo, CO 81009

Additionally, the November 1980 DRIVER, a special issue about economical transportation, has proven to be very popular with new car buyers as well as those people facing the increased pinch on their transportation budget. Most base libraries have a copy.

COMMENT: What do you think about turbocharging our 1972 V-8?

REPLY: I'm not sure why you would want to. The only reason to turbo-charge is to get more power, and the car you mentioned in your letter should be able to keep up on any highway in this country or overseas. There are several problems to overcome when turbocharging any vehicle, not the least of which are increased oiling difficulties and blown headgaskets. Personally, I would consider turbo-charged vehicles only as they come from an original manufacturer — and even then, only from the largest companies.

COMMENT: Your December 1980 Double Tech failed to carefully distinguish between traditional tar-base undercoating, which is useful only for insulation, and specially developed "rustproofing" treatments. Whether the substance used remains "soft" is diffcult for the purchaser to determine. Even tar-based undercoating remains somewhat pliable for several years. At some point, however, it does harden and crack, as you pointed out. Then, from the standpoint of preventing rust, the undercoating is worse than no treatment at all, because the corrosive substances remain moist, trapped against the exposed underbody of the car. "Undercoating" should not be considered as a less expensive compromise — it should be avoided, since it's worse than leaving the underbody uncoated.

REPLY: I've found the direct approach works best when determining "soft" versus "hard" products; I ask, "How long does your product remain soft?" Most sales pitches will include telling you that their product is either "soft" or "hard" as well as why their's is best.

COMMENT: After reading your excellent articles on tires in your January 1981 issue of DRIVER Magazine, I felt as though I had to put in my two steel belt's worth. Your articles led me to believe that for the most part radial tires are the way to go (for many reasons) when it is time to replace tires. I believe that people should be aware that some older (pre-1972) cars cannot/should not use radials. For example, my 1969. When I went looking through the owner's manual it said very plainly that radial tires would radically upset the car's stability. Further investigation in the chassis service manual backed this up. The company redesigned its suspension on its large cars in late-1972 to accommodate radials (for fuel economy gains). I just thought that I would let my knowledge of this out to prospective buyers of radials. If in doubt, either check the owner's manual or the car dealer familiar with your make of vehicle.

REPLY: I think the third paragraph of the first tire article in that issue says it best: " . . . most tire buyers . . . depend on the tire dealer to guide them through what can be a confusing mass of information. They trust the dealer to provide them with the right tires for the job and the information needed to maintain them. Therefore, it is of the utmost importance that buyers carefully discuss some basic points with the dealer."

In my opinion, a manual written more than 10 years ago about the tires of the preceding decade may not be the best source of information. On the other hand, a reputable tire dealer can provide considerable insight.

Granted, suspension systems have to be designed around radial tires to get the maximum performance, but this by no means makes radials unsafe.

During the early years of radial development, they were noted for losing traction without warning under hard cornering conditions. In addition, radials deliver a hard ride at low speed. Thus, 10 years ago domestic manufacturers were very leery of radials. However, since then the radials have matured and manufacturers have come to respect them.

Again, I'd ask a reputable tire dealer before deciding that my old car would be unstable on radials.

EDITOR'S NOTE: Unlike other question and answer columns, Double Tech doesn't deal with specific questions, but instead fields general interest comments. However, when sending questions or comments to Double Tech be sure to include all available information as this will help in finding the correct solution. If you have a question you'd like an answer to, and feel others could use the knowledge also, send it to:

Double Tech
DRIVER Magazine
HQ AFISC/SEDD
Norton AFB, CA 92409

BACKFIRE
LETTERS to the EDITOR

CRUISE CONTROL

I recently had cruise control installed in my 1976 Chevette and have been delighted with it. I read a few of your letters to the Editor about the danger of using cruise control under less than perfect conditions such as slick, wet roads or in heavy traffic. My cruise control automatically turns off if I go into a skid or use the brakes. These are two safety features I like very much.

I want to suggest to your readers that cruise control should be used by an alert driver, in light traffic, in good weather and on good roads. I believe that sleepiness increases in a tired driver when he/she uses cruise control. Also it's harder to react quickly to problems developing on the road ahead if you have disengage the cruise control first.

Cruise Control is a Godsend, especially on long trips (no more cramped foot from holding the gas pedal down!), but it should always be used with respect.

1Lt Cheryl L. Morris, USAF
Wheeler AFB, HI 96854

NOT OUR HOLMES!

I have sure enjoyed the DRIVER Magazine; its practical, readable information is appreciated and used by everyone in this office.

"The Adventure of the Damp Street" in your March 1981 edition was superb. Jeri Rood did a tremendous job blending humor, fact, and pictures into the best safety article I've ever read. The "You Bet Your Gas" quiz capsulized some things I had heard with some ideas that were new to me. Because of that article I've found some ways I can save some more gasoline.

There was just one possible flaw I wanted to bring to your attention. On page four Sherlock appears to be steering into a skid with one hand on his pipe; jolly bad form.

Thank you for an enjoyable and informative magazine. I am one of many appreciative readers at Mather AFB.

Capt Loren M Reno, USAF
Mather AFB, CA 95655

You're right; we missed that one. Our Holmes is a non-smoker and he didn't like the taste of that pipe!

FLASHING LIGHTS

I just finished reading your February 1981 DRIVER Magazine and was astonished at your advice you gave for night driving. It was in the article titled "Lo Light, No Light."

At no time should you ever flash your high beams at another driver to remind him of his lights. Not only is this very dangerous (now you'll have two drivers with possible glare blindness) it is also against the law in most states. You cannot flash your high beams within 500 feet of an oncoming vehicle.

The majority of your articles are very informative, but please, be more careful because after all you are a safety business.

ASH2 Thomas L. Wilharms, USN
NAS North Island, CA 92135

Our state is California and California's law states, "Whenever the driver of a vehicle approaches an oncoming vehicle within 500 feet, he shall use a distribution of light or composite beam so aimed that the glaring rays are not projected into the eyes of the oncoming driver." This wording is from the Unform Vehicle Code., so many other states have the same provision. The International Association of Chiefs of Police (IACP) tells us this law was never intended to prohibit the flashing of lights, just to stop people from turning them on and leaving them on in the face of oncoming traffic. IACP also said it is a commonly accepted practice to flash lights to inform the other driver he has his high beams on, and also to alert a driver ahead that you are about to pass him.

If your state specifically prohibits flashing of lights, then don't do it. It is perfectly legal here in California.

A SET UP

You lose your DRIVER's license for putting an ash tray next to the bed. This is the picture on page 10 of the February issue of DRIVER. Do you advocate smoking in bed?

Col Earl S. Van Inwegen, USAF
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In your February issue you have a very interesting and informative article regarding marathon driving or *dead* tired. Every one of us have, at one time or another, been faced with the decision of whether or not to stop or "push on." Returning from an isolated/unaccompanied assignment to going home for the holidays as quickly as possible. Most of the time we are only an hour or two from our destination and "push" looks so inviting.

I'm not writing to question the validity of your story. I want to point out another serious safety violation implied in the funny but educational picture on page 10. What is the ashtray doing so close to the bed? This is just asking for trouble and making smoking in bed too darned easy. Maybe these two won't get hurt on the road but if, as the photo implies, the guy in the lower bunk smokes neither may "get back on the road."

Keep up the good work and thanks for keeping me awake!

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The picture referred to is a funny we set up showing two fellows in a double-bunk waking up after spending the night at the side of the road. They are surrounded by a chair, a night table, lamp, radio and other home comforts, including an ashtray stand in easy reach of the lower bunk. Maybe we went too far on that one!

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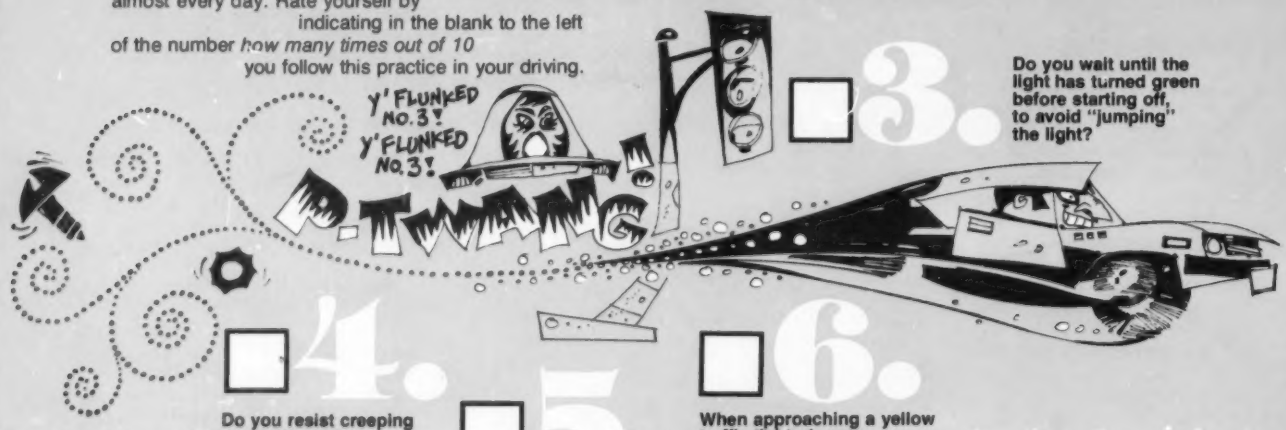
rate your driving habits

The kind of driver you are depends on how you routinely behave in traffic, day in and day out. Following are 10 common situations most drivers face almost every day. Rate yourself by indicating in the blank to the left of the number *how many times out of 10* you follow this practice in your driving.

☐ **1.** **Do you give a signal to warn others before making turns at intersections?**

☐ **2.** **Do you come to a *complete* stop at intersections with flashing red traffic lights?**

☐ **3.** **Do you wait until the light has turned green before starting off, to avoid "jumping" the light?**



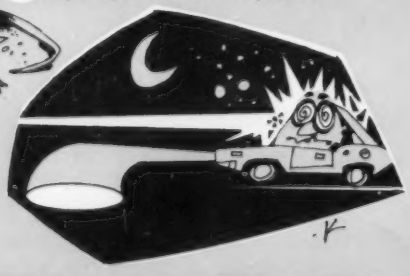
☐ **4.** **Do you resist creeping up to 60 or 65 when the speed limit is 55 mph?**

☐ **5.** **Do you and all your passengers wear safety belts even when going only a short distance?**

☐ **6.** **When approaching a yellow traffic light, do you stop instead of speeding up to "beat" the red light?**

☐ **7.** **Do you come to a *complete* stop at STOP signs when you see there are no cars approaching?**

☐ **8.** **When a solid, double-yellow center line is directly ahead, do you wait for a broken line to pass the car in front of you before you move out to pass it?**



☐ **9.** **When traveling at 55 mph on a two-lane road, do you slow down for a crossroad intersection where there are no traffic lights or stop signs?**

☐ **10.** **Do you leave your headlights on low beam even when the driver of an oncoming car fails to dim his?**

YOUR SCORE

The higher your score the better. A score of 80 or better is indicative of good driving habits.

The real test is the way you perform in traffic — each time you drive. And, the real question you have to answer for yourself is: What would my score have been if someone had rated me under actual driving conditions?

(Highway Users Federation)